

4 October 2021

Circular Water 2050

Impact and opportunities for the fully circular urban water cycle

Kees Roest

KWR

Bridging Science to Practice



**ENERGIE EN
Grondstoffen
FABRIEK**

stowa

 **aqua
minerals**

4 October 2021



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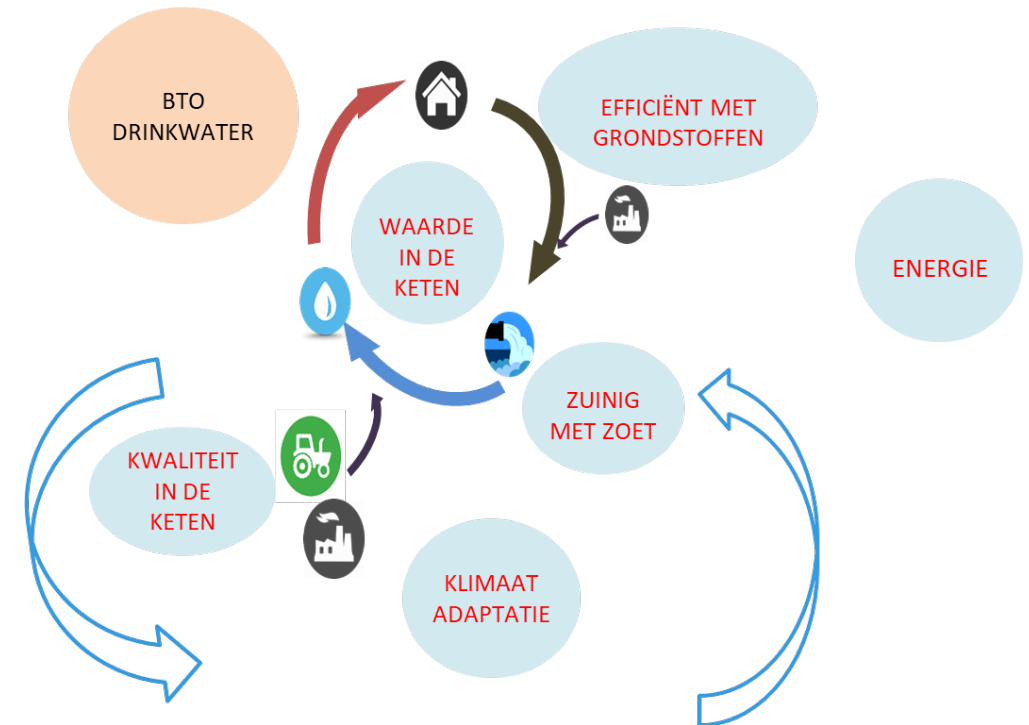
Program Director - Industrial Fluids Processing @
Institute for Sustainable Process Technology



Bridging Science to Practice

Joint Research Program Water in the Circular Economy (WiCE) - Circular Water 2050

- Focus on closing water cycles and recovering raw materials and energy from water.
- Preserve and enhance the value of water throughout the cycle.
- Water companies and parties in and around the water chain are conducting joint research to contribute to the climate targets, the Netherlands Circular in 2050 and the energy transition.



Government-wide Circular Economy program

Aim: the Netherlands Circular in 2050

Ministerie van Infrastructuur en Milieu



> Retouradres Postbus 20901 2500 EX Den Haag

De voorzitter van de Tweede Kamer
der Staten-Generaal
Binnenhof 4
2513 AA DEN HAAG

**Ministerie van
Infrastructuur en Milieu**
Plesmanweg 1-6
Den Haag
Postbus 20901
2500 EX Den Haag

Ons kenmerk
IenM/BSK-2016/175734

Bijlage(n)
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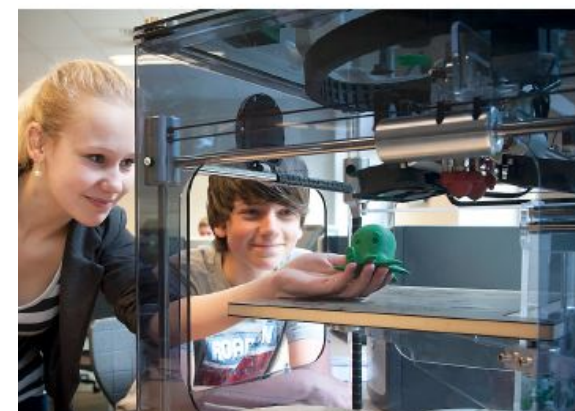
Datum 14 september 2016
Betreft Rijksbrede programma Circulaire Economie

Geachte voorzitter,

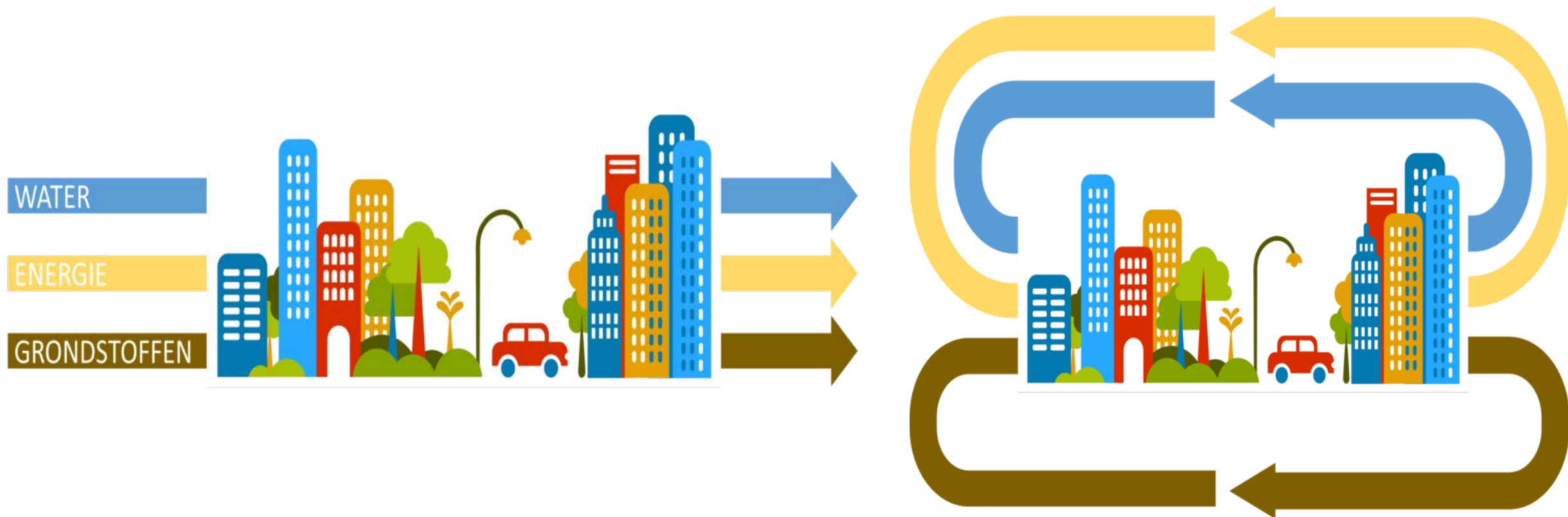
Hierbij ontvangt u, mede namens de minister voor Buitenlandse Handel en Ontwikkelingssamenwerking en de minister voor Wonen en Rijksdienst, het Rijksbrede programma Circulaire Economie: 'Nederland circulair in 2050'.

Nederland circulair in 2050

In het kort



Transition from linear to circular



WiCE Circular Water 2050

Impact and opportunities that lead to the realization of a fully circular water chain in 2050

- 1) Provide insight into all incoming and outgoing material flows in the water chain (drinking water companies, water boards and possibly also municipalities) in the current situation.
- 2) Investigate, describe, discuss, define and record what is understood in the water chain by fully circular in 2050 (dot on the horizon).
- 3) Determine which possible measures and actions are required (designed as route(s) map) to transform the current water chain into a fully circular water chain in 2050.

<https://www.kwrwater.nl/en/projecten/circular-water-2050/>

Definition Circular Economy

- Physical dimensions (like substance flows)
- Socio-economic values (like efficient, social responsible, quality of life)

Definition Circular Economy according to the SER*:
An economy that handles products, materials and resources efficiently and in a socially responsible manner within ecological preconditions, so that future generations also retain access to material prosperity.

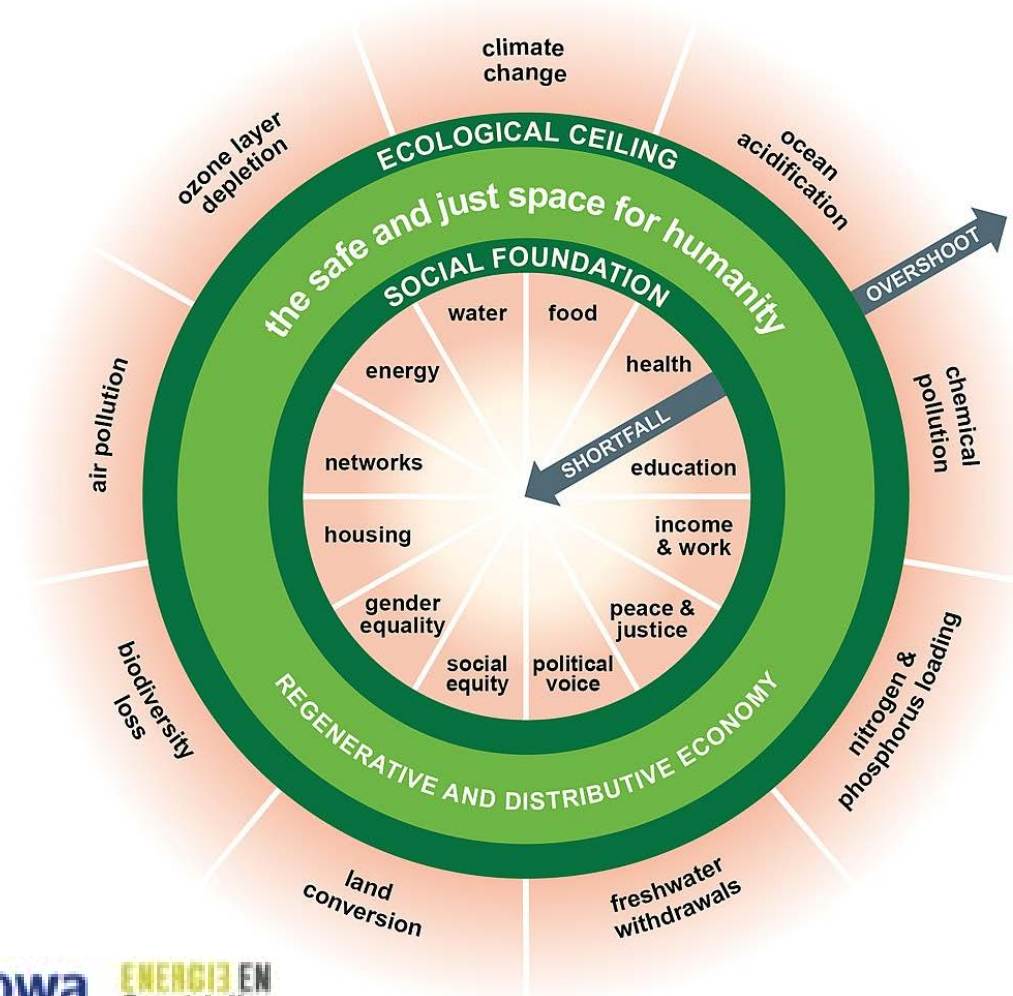
*The Social and Economic Council of the Netherlands:

- an advisory body in which employers, employees and independent experts (Crown-appointed members) work together to reach agreement on key social and economic issues. (<https://www.ser.nl/en/SER/About-the-SER/What-is-the-SER>, Sociaal-Economische Raad (2016) Advies Werken naar een circulaire economie: geen tijd te verliezen, p. 11)

The Doughnut of social and planetary boundaries (2017) – Kate Raworth

To further define what we mean by "fully circular in 2050" we need to operationalize this concept.

Operationalization involves the concrete formulation of abstract concepts from a theory as (measurable) variables. We want to accurately and clearly identify the various characteristics of "fully circular" in recognizable categories to make the concept usable for application in policy-making and planning.

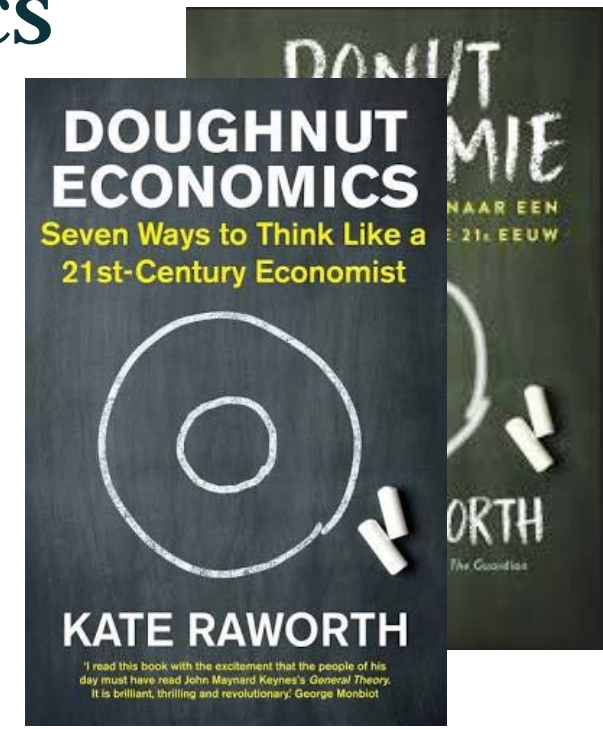


Visualisation of the Doughnut Economics

a scorecard for the circular water cycle

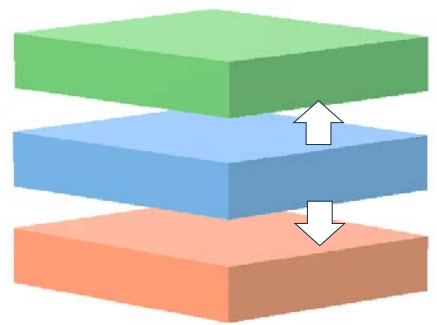


In the model of the Doughnut Economics, the space between the social foundation and the ecological ceiling stands for "The safe and just space for humanity". In order to operationalize the Circular Economy principle for the water chain, properties of the water system itself have been added as an intermediary layer, between the social foundation and the ecological ceiling. The social foundation indicators have been replaced by the circular features of "values for people", such as "public health". In a similar way as in the model of the Doughnut Economics, these characteristics are about needs that the system must meet. The indicators for the ecological ceiling have also been replaced, in this case by the characteristics of the "energy and material flows", such as "energy consumption". These characteristics concern the softening of (natural) resources. As in the original model of the Donut economy, the layers are visualized as a circle with two rings around it.



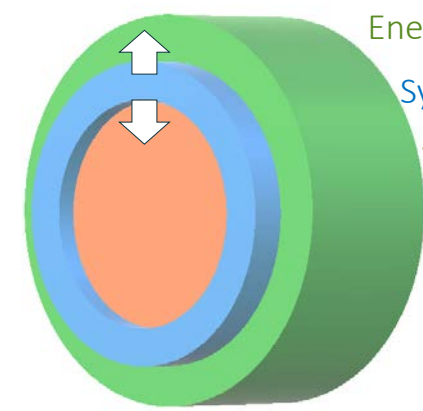
The Doughnut economics

- The ecological ceiling
- The safe and just space
- The social foundation



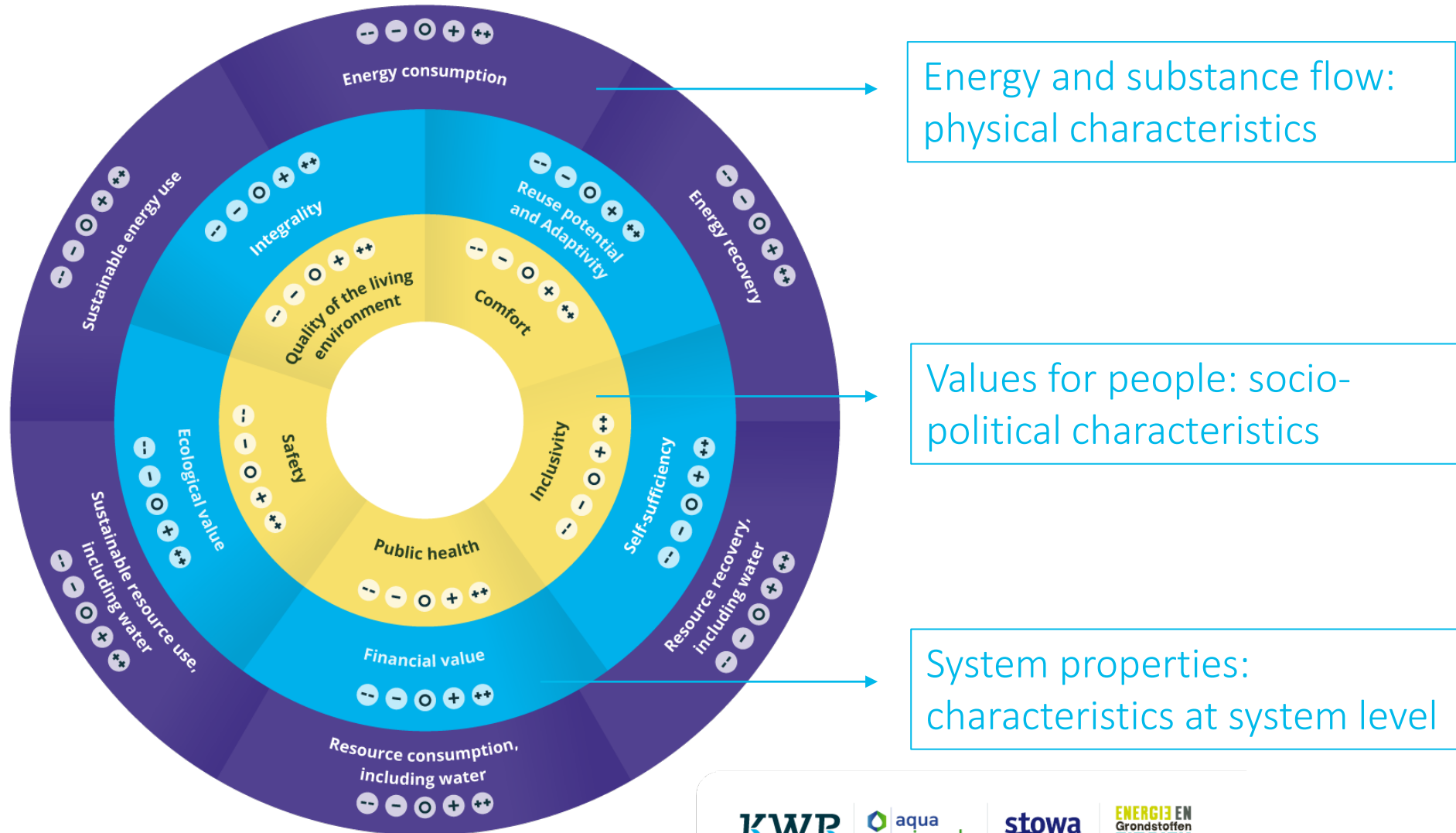
The Circular Water Cycle

- Energy and material flows
- System properties
- Values for people

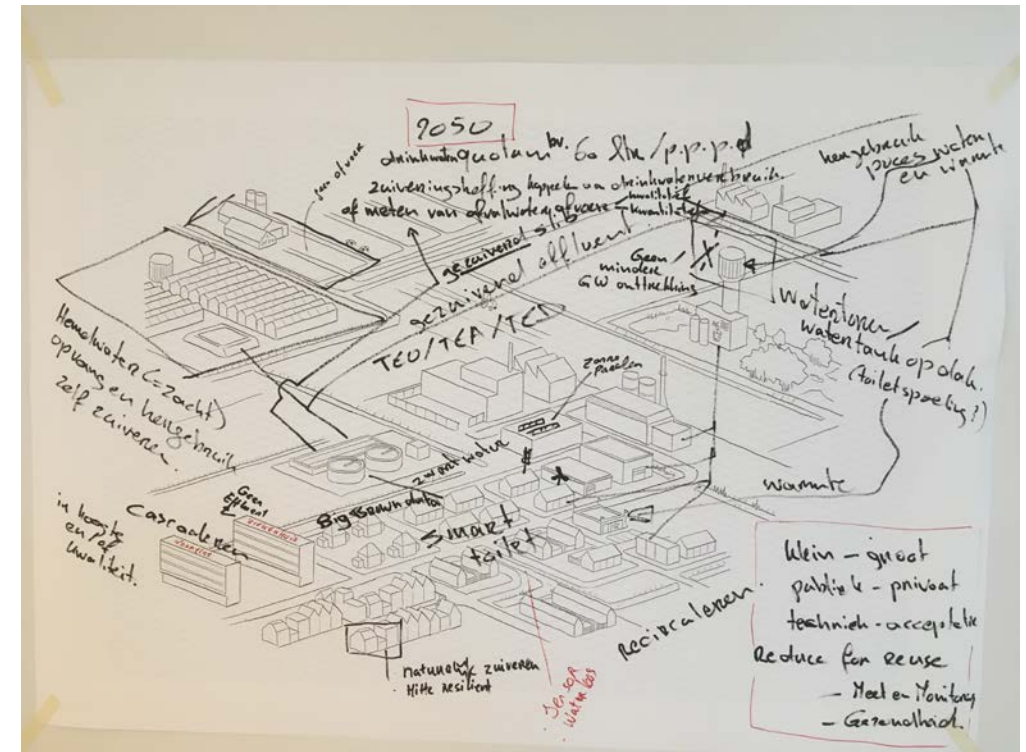
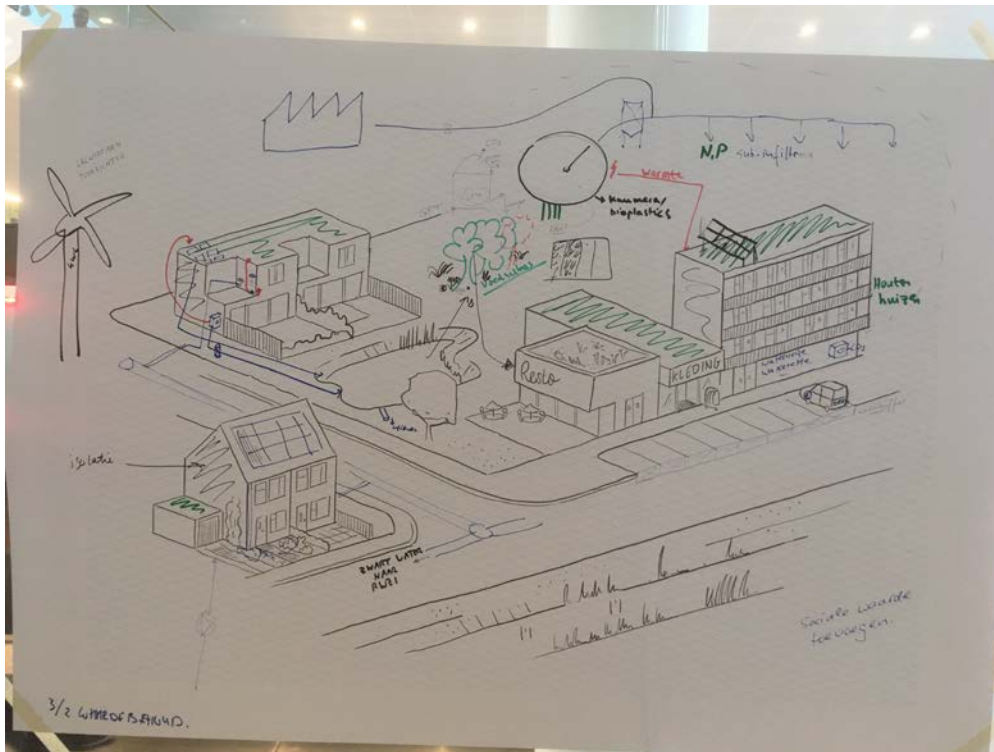


- Energy and material flows
- System properties
- Values for people

New dashboard model for the water sector



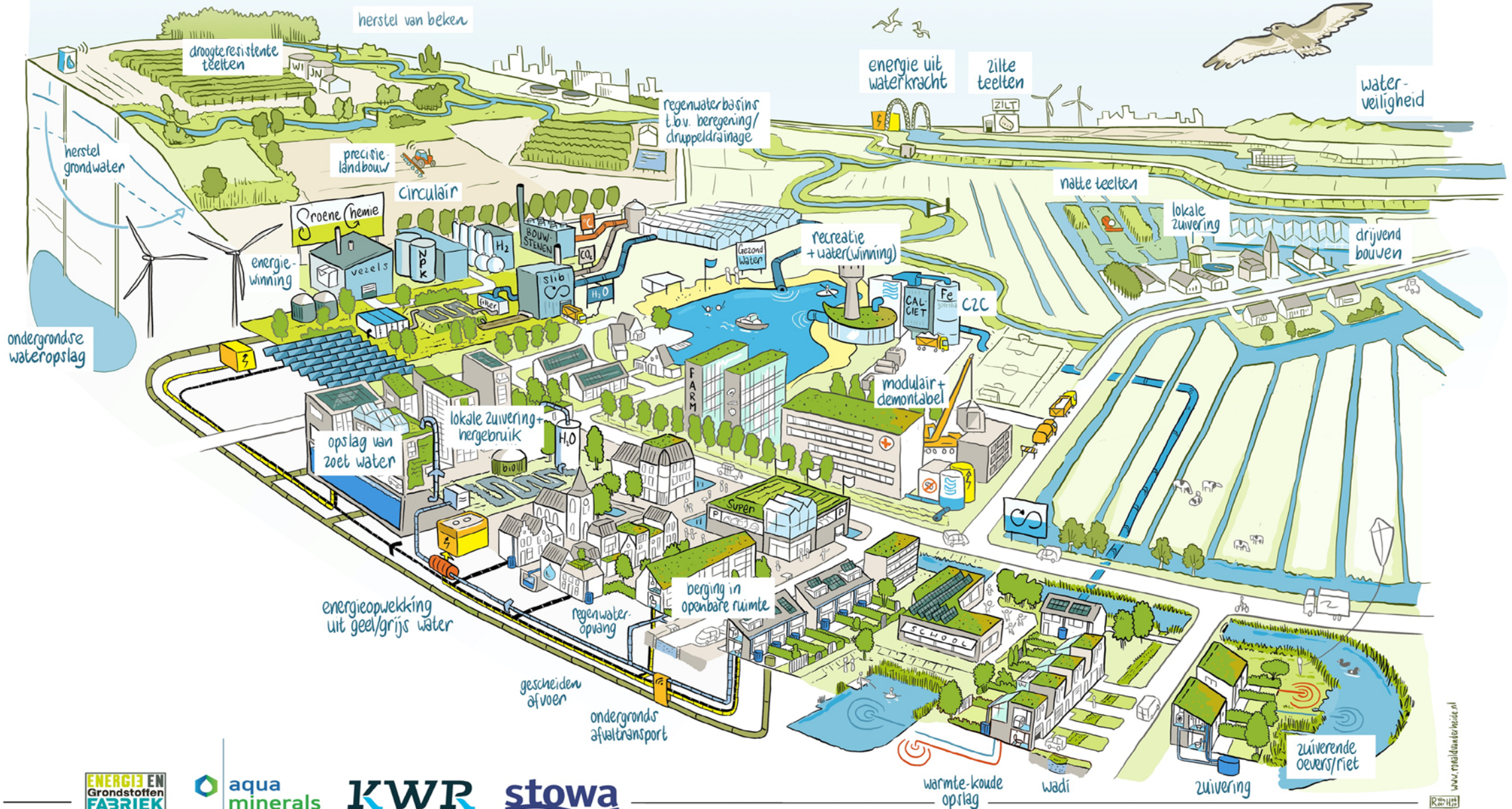
Workshops with diverse groups from within & outside the water sector (academics, professionals, generalists..)



Naar een circulaire waterketen

Een toekomstvisie voor 2050

... so facts, data and flow charts give additional information and helps to focus

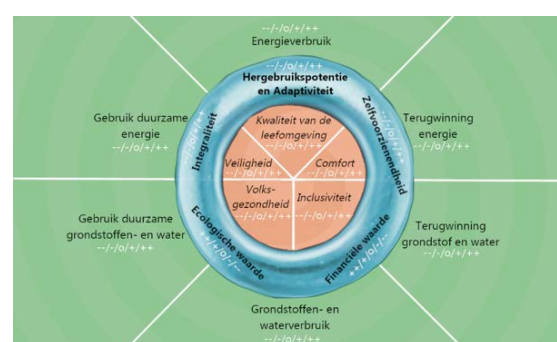


Backcasting development paths

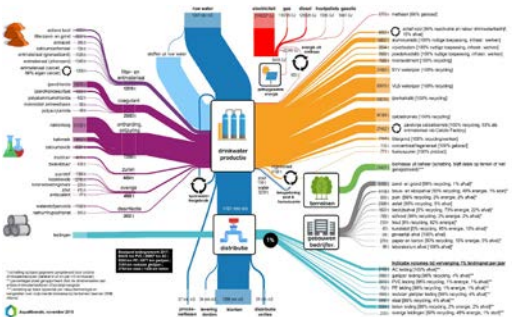
For a realistic backcasting, the choices depend on the specific situation of the city, the water company, geographical location, financial situation, etc.

For example, the implementation of one and the same solution can vary between locations/cases.

We aim for a backcasting for a typical Dutch town or neighborhood with a hypothetical baseline measurement (T2020) and a dot on the horizon (T2050)



Compelling Vision 2050



Impact and opportunities for the fully circular urban water cycle – Circular Water 2050

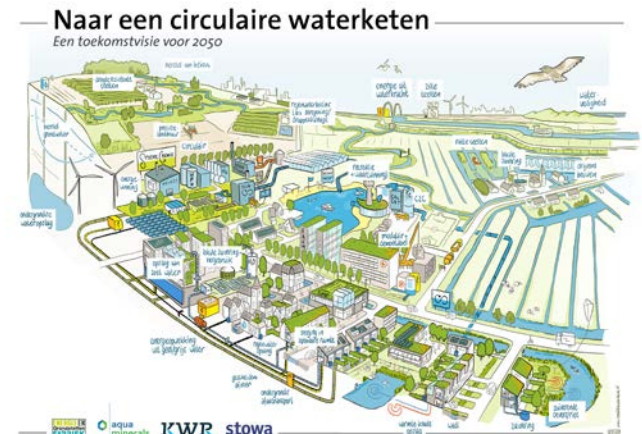
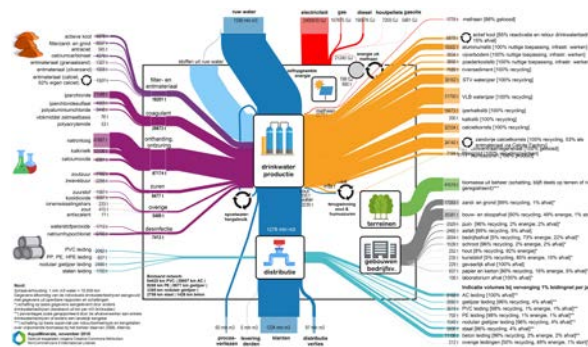
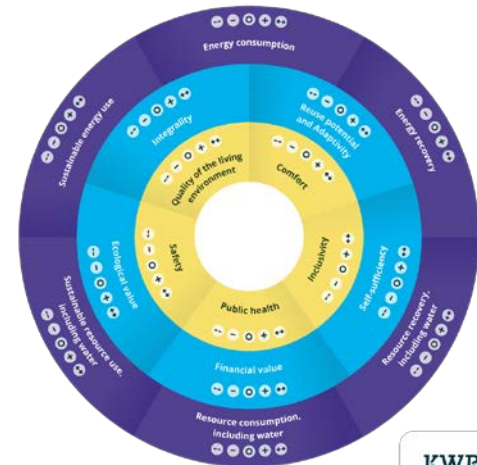
How does the current water chain score on circular characteristics?

A scorecard with a clear number of recognizable and clearly defined characteristics of a circular water cycle

How far does the water sector want to be in 2050 in terms of circularity? = *dot on the horizon*

But HOW can and do we want to realize this? = *Backcasting*

Make it tangible for administrators, policymakers and planners





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The collective research programme Water in the Circular Economy (WiCE) involves the joint research of the water companies and of stakeholders in and associated with the water cycle, with the objective of contributing to the societal challenges regarding the circular economy, climate adaptation and the sustainable energy transition.

